

EE 620: Physics of Transistors

Assignment 4: Report

Dimple Kochar- 16D070010

1. IL Thickness= 5.96×10^{-8} cm

2. NA doping= 1.3×10^{16} cm⁻³

3. CFB= 2.73×10^{-7} F/cm²
CMG= 5.52×10^{-8} F/cm²

4. Ideal device

VFB= -0.352V

VMG = 0.0122V

VT= 0.369V

5. As fabricated device

VFB= -0.225V

VMG= 0.075V

VT= 0.532V

6. Stressed device

VFB= -0.425V

VMG= -0.125V

VT= 0.132V

7. Fixed charges

As fabricated: 2.04×10^{-7}

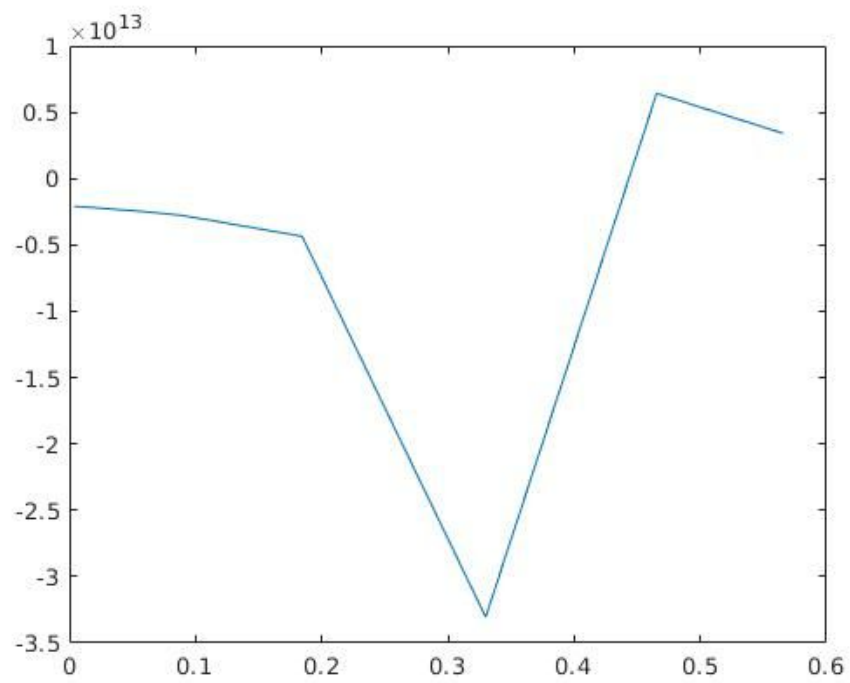
Stressed: -4.45×10^{-7}

8.

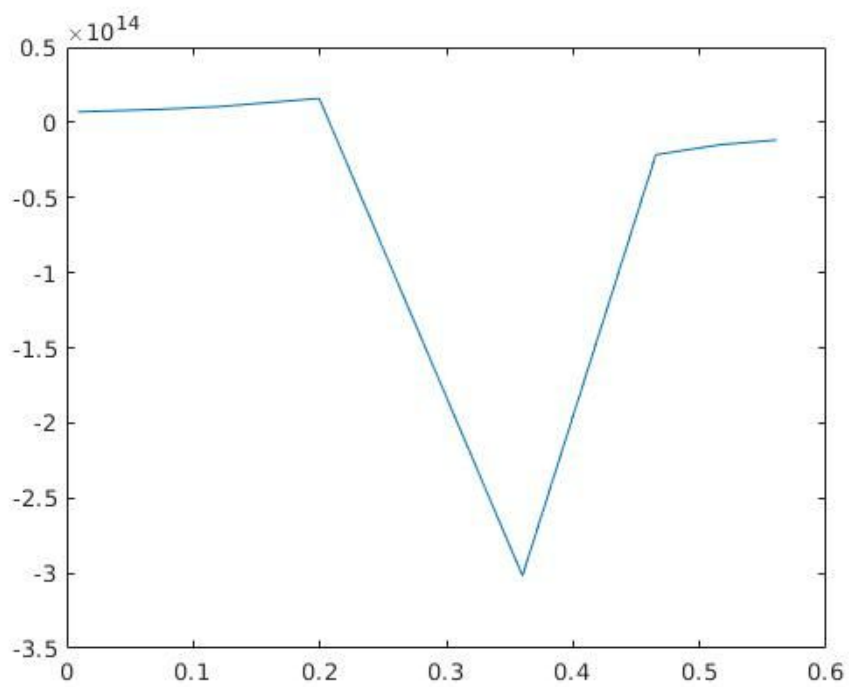
What I did:

- 1) Made ideal CV curve and plotted ideal and as fabricated curve on the same axis.
- 2) Used 'ginput' command and obtained 10 points on CV curves of both for the same capacitance after $V_g > V_{fb}$ (since we were asked to plot for surface band bending from 0 to $2 \times \phi_{if}$)
- 3) Obtained ΔV_g . Then from the V_g of ideal CV, obtained ψ_s (surface band bending) for each V_g .
- 4) Calculated dit as $(C_{ox}(\Delta V_g) - Q_{ox}) / (-q(\psi_s - \phi_{if}))$

As fabricated:



Stressed:



9. CV-

